MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2016/2017

TCS2221 – COMPUTER GRAPHICS

(All Sections/Groups)

4 MARCH 2017
02:30PM – 04:30PM
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 3 pages (including cover page) with 4 structured questions.

2. Answer ALL questions. The distribution of the marks for each question is given.

3. Please write all your answers in the answer booklet provided.

Question 1

(a) Fill in the right color codes in the table below:

Color	RGB Model	CMY Model	HSV Model
Cyan			
Magenta			
Yellow			
White			

[6 marks]

(b) Write the OpenGL commands to perform the following:

i. Enable the lighting.

ii. Set the light source of ambient lighting using the default ambient RGBA intensity of light.

[2 marks]

(c) Briefly compare texture scanning and pixel-order scanning in surface texture mapping. [2 marks]

Question 2

(a) Given the following lines of codes in the display function of an OpenGL program:

```
glBegin (GL_POLYGON);
    glVertex2f (-0.5, -0.5);
    glVertex2f (-0.5, 0.5);
    glVertex2f (0.5, 0.5);
    glVertex2f (0.5, -0.5);
glEnd ();
```

Sketch the output of the program. After that, write the code that set the polygon color to red and the background color to white.

[4 marks]

(b) Visible surface detection eliminates the surfaces on the three dimensional objects that are invisible with respect to the user's viewing direction.

i. Provide three scenarios when an object is considered invisible together with the corresponding visible surface detection method. [3 marks]

ii. Compare the object-space and image-space visible surface detection methods.

[2 marks]

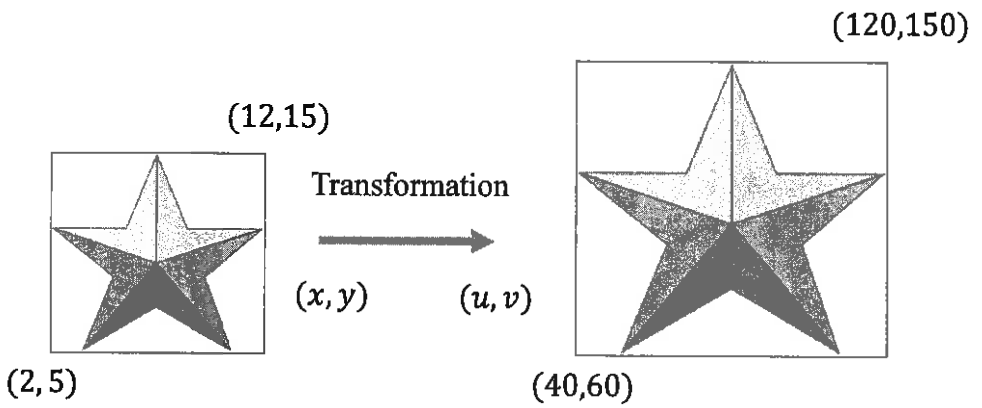
(c) Briefly explain what projection is. [1 mark]

Continued...

Question 3

(a) The clipping window selects *what* user want to see; the viewport indicates *where* it is to be viewed on the output device. Given the following configurations, determine the Window-to-Viewport transformation.

[4 marks]



(b) Given a straight line from an endpoint coordinate (2, 0) to coordinate (6, 2), indicate which raster locations would be chosen by the Midpoint Algorithm.

[5 marks]

(c) Three control points of a Bezier curve are P_0 = (4, 5), P_1= (6, 7) and P_2= (8, 9). What are the coordinates on the curve when the ratio u = 1.0?

[1 mark]

Question 4

Translate a 2D object to coordinate (5, 10). Then, scales the object 3 times along X-axis and 6 times along Y-axis. Next, rotate the object at 60 degree anti-clockwise about Z axis.

(a) List the matrices of translation, scaling, and rotation of the above transformations.

[3 marks]

(b) Find the composite matrix ($\mathbf{C}_m$) for the transformation above.

[5 marks]

(c) What is the new coordinate if the same transformation is applied on point Q (60, 5)?

[2 marks]

End of Paper